

WHAT IS CLAIMED IS:

1. A storage system that is connected to at least one computer, the storage system comprising:

5 a first interface control device that receives from the at least one computer an access request designating identification information of a file;

a second interface control device connecting to the first interface control device; and

a plurality of disks connecting to the second interface control device,  
10 wherein the plurality of disks include at least one first disk, and at least one second disk, the first disk and the second disk being different kinds, the first interface control device decides based on identification information received from the computer a storage position of data of the file designated by the identification information within the plurality of disks, and

15 the second interface control device controls to store the data of the file designated by the identification information at the storage position decided by the first interface control device.

2. A storage system according to claim 1, wherein the at least one  
20 first disk is a Fibre Channel disk equipped with a Fibre Channel type interface, and the at least one disk is a serial ATA disk equipped with a serial ATA type interface.

3. A storage system according to claim 1, further comprising a memory, a memory controller for controlling the memory, a plurality of first interface control devices each being connected to the memory controller, and a plurality of second interface control devices each being connected to the  
5 memory controller,

wherein one of the first interface control devices receives identification information of a file and data of the file from the computer, and stores the data of the file in the memory, and

one of the second interface control devices that is connected to one of  
10 the disks that is to store the data of the file controls to store the data of the file retained in the memory in the one of the disks according to the storage position of the data of the file decided by the first interface control device.

4. A storage system according to claim 1, wherein  
15 a first storage region exists in the at least one first disk,  
a second storage region exists in the at least one second disk, and  
the first interface control device sets up a first file system in the first storage region, and a second file system in the second storage region.

20 5. A storage system according to claim 4, wherein the first interface control device decides, according to static property that is predetermined property and dynamic property that is property that changes with passage of time since a point of time when the file is created, as to which

one of the first storage region and the second storage region to store the data of the file indicated by the identification information.

6. A storage system according to claim 5, wherein the first  
5 interface control device controls to migrate data of a file stored in one of the first storage region and the second storage region to the other storage region according to a change in the dynamic property, and changes identification information that specifies the file and information indicative of correlation between the file and the storage position.

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7. A storage system according to claim 6, wherein the static property includes at least one of information that specifies a kind of the file, information that specifies a time when the file is created, and information that specifies a value of the file, and the dynamic property includes at least  
15 one of information concerning an access property to the file, and information concerning passage of time elapsed since the file is created.

8. A storage system that is connected to a computer, the storage system comprising:

20 at least one first interface control device that connects to the computer and receives from the computer an access request containing identification information of a file;

at least one second interface control device that connects to the at least

one first interface control device; and

a plurality of first disks each being connected to the at least one second interface control device,

wherein the at least one first interface control device connects to a  
5 second storage system having a plurality of second disks,  
a first storage region is set in the plurality of first disks,  
a second storage region is set in the plurality of second disks,  
the at least one first interface control device, upon receiving an access  
request from the computer, decides, according to property of a file designated  
10 by identification information contained in the access request received, as to  
which one of the first storage region and the second storage region to store  
data of the file,

when the data of the file is stored in the first storage region, the at  
least one second interface control device stores the data of the file in one of  
15 the plurality of first disks, and

when the data of the file is stored in the second storage region, the at  
least one first interface control device that received the access request from  
the computer controls such that the data of the file is transmitted to the  
second storage system through the at least one first interface control device  
20 that is connected to the second storage system.

9. A storage system according to claim 8, wherein

the second storage system includes a third interface control device that

receives an access request having identification information of a file, and that accesses a storage region within the second storage region correlated to the identification information received to thereby access data of the file specified by the identification information.

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10. A storage system according to claim 9, wherein the third interface control device sets a file system in the second storage region, and wherein, when the first interface control device receives an access request from the computer, and when data of a file designated by identification  
10 information contained in the access request is to be stored in the second storage region, the first interface control device controls to transmit the access request having the identification information correlated to the file to the third interface control device through the first interface control device connected to the second storage system.

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11. A storage system according to claim 10, wherein the first interface control device connected to the second storage system receives an access request from the computer.

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12. A storage system according to claim 10, wherein the first interface control device migrates the data of the file from the first storage region to the second storage region through the third interface control device, based on property of files whose data is stored in the first storage region.

13. A storage system according to claim 12, wherein, when the first interface control device migrates data of a file stored in the first storage region to the second storage region, the first interface control device transmits to the third interface control device an access request having  
5 identification information correlated to the file, and stores the identification information of the file received from the computer correlated with the file system set in the second storage region.

14. A storage system according to claim 13, wherein  
10 the first interface control device stores information concerning property of files and information concerning property of the first storage region and the second storage region, and decides, based on the information concerning property of files and the information concerning property of the first storage region and the second storage region, as to whether or not data  
15 of a file stored in the first storage region is to be migrated to the second storage region.

15. A storage system that is connected to a computer, the storage system comprising:

20 a first interface control device that receives from the computer an access request having identification information for designating a file;

a second interface control device that is connected to the first interface control device;

a plurality of first disks that are connected to the second interface control device;

a third interface control device that is connected to a second storage system having a fourth interface control device that receives an access  
5 request containing address information indicating a storage position of data and having a plurality of second disks that are connected to the fourth interface control device;

a first storage region existing in the plurality of first disks; and

a second storage region existing in the plurality of second disks;

10 wherein

the first interface control device, upon receiving an access request for a file from the computer, decides as to which one of the first storage region and the second storage region to store data of the file according to property of the file indicated by identification information contained in the access request  
15 received,

when the data of the file is stored in the first storage region, the second interface control device stores the data of the file in one of the plurality of first disks, and

when the data of the file is stored in the second storage region, the first  
20 interface control device controls to transmit to the fourth interface control device through the third interface control device the access request containing address information for an address within the second storage region where the data of the file is to be stored.

16. A storage system according to claim 15, wherein the third interface control device is an interface control device that corresponds to a block I/O interface.

5 17. A storage system according to claim 16, wherein the first interface control device sets up a file system in the second storage region.

18. A storage system according to claim 17, wherein the first interface control device controls to migrate data of a file from the first storage  
10 region to the second storage region through the third interface control device based on property of the file whose data is stored in the first storage region.

19. A storage system according to claim 18, wherein, when the first interface control device migrates the data of the file stored in the first storage  
15 region to the second storage region, the first interface control device controls to transmit to the second storage system through the third interface control device an access request containing an address of a storage region in the second storage region that stores the data of the file, and changes relation between identification information of the file and information indicating the  
20 storage region that stores the data of the file.

20. A storage system that is connected to a computer, the storage system comprising:



a first node that receives from the computer an access request containing identification information of a file;

a second node that is connected to at least one first disk;

a third node that is connected to at least one second disk and a second  
5 storage system that is connected to the at least one second disk and has a file I/O interface control device that receives an access request having identification information of a file;

a fourth node that is connected to at least one third disk and a third  
storage system that is connected to the at least one third disk and has a block  
10 I/O interface control device that receives an access request having address information of the file indicating a storage position of the file within the at least one third disk; and

a switch device that mutually the first node, the second node, the third node and the fourth node,

15 wherein a first storage region exists in the at least one first disk, a second storage region exists in the at least one second disk, and a third storage region exists in the at least one third disk, and

the first node controls to store data of the file in one of the first storage region, the second storage region and the third storage region according to  
20 property of the file specified by identification information received from the computer.

21. A storage system according to claim 20, wherein, when the data

of the file is stored in the first storage region, the second node controls to store the data of the file in a storage region in the at least one first disk.

22. A storage system according to claim 20, wherein, when the data  
5 of the file is stored in the second storage region, the first node controls to transmit to the second storage system through the third node an access request containing identification information correlated to the file.

23. A storage system according to claim 20, wherein, when the data  
10 of the file is stored in the third storage region, the first node controls to transmit to the third storage system through the fourth node an access request containing address information indicating a storage position of the data of the file.

15 24. A storage system according to claim 20, wherein,  
when the data of the file is stored in the first storage region, the second node controls to store the data of the file in a storage region in the at least one first disk,

when the data of the file is stored in the second storage region, the first  
20 node controls to transmit to the second storage system through the third node an access request containing identification information correlated to the file,  
and

when the data of the file is stored in the third storage region, the first

node controls to transmit to the third storage system through the fourth node an access request containing address information indicating a storage position of the data of the file.

- 5           25.    A storage system comprising:
- a file I/O interface control device; and
- a plurality of disk pools,
- wherein the file I/O interface control device sets one of a plurality of storage hierarchies defining storage classes, respectively, for each of LUs
- 10     within the disk pools, thereby forming a file system in each of the LUs, and
- the file I/O interface control device migrates at least one of the files from one of the LUs to another one of the LUs of an optimal storage class, based on static properties and dynamic properties of each file.